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(54) IMPROVEMENTS IN OPERATING MECHANISMS FOR OUTLET  
 MECHANISMS OF FLUID CONTAINERS

(71) We, DR. KARL THOMAE G.m.b.H.,  
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 an der Riss, Germany, do hereby declare the  
 invention, for which we pray that a patent  
 may be granted to us, and the method by  
 which it is to be performed, to be particu-  
 larly described in and by the following state-  
 ment:—

This invention relates to an operating  
 mechanism for an outlet mechanism of a  
 fluid container for example an aerosol can  
 or a fluid container having a manually oper-  
 able pump mechanism for extracting the  
 fluid.

This invention has particular though not  
 exclusive application to containers of fluid  
 medicament which is ejected by a pump  
 mechanism from the container in doses as  
 a fine spray.

The present invention provides an appara-  
 tus mechanism for an outlet mechanism  
 of a fluid container, the operating mechan-  
 ism having a body member and a finger  
 operable member movable relative to the  
 body member between first and second posi-  
 tions, a plurality of resilient elements con-  
 nected to one of said members and posi-  
 tioned to abut one or more abutments of  
 the other of said members by way of a  
 wedge or cam surface or surfaces disposed  
 on said resilient elements or said one or  
 more abutments, said elements and abut-  
 ment or abutments being so disposed and  
 arranged that when pressure is exerted on  
 said finger operable member, said resilient  
 elements flex freely under compression in  
 a direction transverse to the direction of  
 movement of the finger operable member  
 and there being no obstruction to such flex-  
 ing movement, and when said pressure  
 reaches a predetermined level, the flexed  
 resilient elements spring out of engagement  
 with the abutment or abutments so that the  
 finger operable member moves between said  
 first and second positions with a snap-action  
 for operating the outlet mechanism.

Where a mechanism according to the in-  
 vention is used with a medicament con-

tainer as described above, a predetermined  
 and reproducible spray droplet size spec-  
 trum can be provided.

The present invention thus extends to a  
 container of a fluid medicament having a  
 pump mechanism operable by an operating  
 mechanism as aforesaid.

The body member may comprise a screw  
 cap for attachment to a suitable container  
 or may comprise the wall of the container  
 itself where the operating mechanism is in-  
 tegral with the container.

The resilient elements are preferably  
 formed as upstanding segments with wedge  
 portions at their free ends and are prefer-  
 ably disposed in a ring about the finger  
 operable member or the body member.

Preferred embodiments of the invention  
 will now be described with reference to the  
 accompanying drawings wherein:—

Figure 1 is a side view partly in section  
 of a first embodiment of an operating mech-  
 anism for operating the pump mechanism of  
 a fluid medicament container; and

Figure 2 is a similar view of a second  
 embodiment.

Referring to Figure 1, the operating mech-  
 anism has a body 2 comprising a screw cap  
 with an internal thread 4 for attachment  
 to a fluid medicament container. A finger  
 operable member 6 is formed as a cap and  
 is mounted on an outlet pipe 8 of a pump  
 mechanism of the container. Cap 6 has a  
 radial outlet bore 10 communicating with  
 the pipe. Cap 6 is movable from a first  
 position shown to a second position in  
 which its annular bottom edge 12 abuts an  
 annular shoulder 14 of cap 2.

Cap 6 has an internal shoulder 16 slightly  
 upwardly inclined and an inner surface por-  
 tion 18 thereabove tapering inwardly to-  
 wards the top of the cap. Shoulder 16  
 abuts resilient segments 20 of screw cap 2.  
 Segments 20 are upstanding from the top  
 of screw cap 2 and are formed as segments  
 of a broken ring extending around the top  
 of screw cap 2. Each segment has at its  
 free end an outwardly extending wedge

portion 22 which abuts against shoulder 16.

In operation, finger pressure is applied to cap 6. This causes segments 20 to flex freely inwardly along their length i.e. in a direction transverse to the direction of movement of the figure operable member, as a result of the compression exerted on wedge portion 22 by shoulder 16. There is no obstruction to such flexing movement in view of the clearance between the segments 20 and pipe 8. There is no substantial movement of cap 6 until at a predetermined pressure level, wedge portions 22 begin to move and are forced to spring out of engagement with shoulder 16. The finger pressure then being applied to cap 6 forces the cap with a snap-action to the position in which edge 12 abuts shoulder 14 and in which the pump mechanism ejects under the finger pressure a dose of medicament in the form of a spray from outlet bore 10. Since the finger pressure causing the pump to operate is predetermined as the pressure required to disengage segments 22 from shoulder 16, a predetermined and reproducible spray droplet size spectrum is provided. Tapering surface portion 18 allows cap 6 to slide smoothly back to the first position, under the action of a restoring spring in the pump mechanism, when finger pressure is released from the cap 6.

The second embodiment shown in Fig. 2 is generally similar to the first embodiment and similar parts are denoted by the same reference numerals. Cap 6 has a bottom part 30 slidably fitting over an annular boss 32 of screw cap 2. The bottom edge 34 of cap 6 tapers outwardly to an outer surface portion 36 which tapers slightly outwardly towards the top of the cap. Resilient segments 20 are similar to those of the first embodiment, apart from being wider, but are disposed in a ring about the perimeter of screw cap 2 and are inwardly facing so that wedge portions 22 abut with edge 34. In operation of this second embodiment, sufficient finger pressure on cap 6 causes segments 20 to be pushed outwardly to allow cap 6 to move downwardly with a snap action in precisely the same manner as in the first embodiment.

#### WHAT WE CLAIM IS:—

1. An operating mechanism for an outlet mechanism of a fluid container, the operating mechanism having a body member and a finger operable member movable relative to the body member between first and second positions, a plurality of resilient elements connected to one of said members and posi-

tioned to abut one or more abutments of the other of said members by way of a wedge or cam surface or surfaces disposed on said resilient elements or said one or more abutments, said elements and abutment or abutments being so disposed and arranged that when pressure is exerted on said finger operable member, said resilient elements flex freely under compression in a direction transverse to the direction of movement of the finger operable member and there being no obstruction to such flexing movement, and when said pressure reaches a predetermined level, the flexed resilient elements spring out of engagement with the abutment or abutments so that the finger operable member moves between said first and second positions with a snap-action for operating the outlet mechanism.

2. A mechanism as claimed in claim 1 wherein the or each resilient element comprises an upstanding segment having at its free end a wedge portion for engaging an abutment.

3. A mechanism as claimed in claim 1 or 2 wherein the resilient elements and abutments have cooperating wedge surfaces.

4. A mechanism as claimed in any preceding claim wherein the other of said members has a tapering surface portion adjacent said abutment(s) to allow the resilient elements to slide easily thereover when they are forced out of engagement with the abutments.

5. A mechanism as claimed in any preceding claim wherein a plurality of resilient elements are disposed in a ring.

6. A mechanism as claimed in claim 5 wherein said abutment comprises an annular shoulder for engaging the ring of resilient elements.

7. A mechanism as claimed in claim 6 wherein said resilient elements are disposed on said body member and said finger operable member comprises a cap slidable towards said body member and arranged to move the resilient elements within the cap during the snap action.

8. A mechanism as claimed in claim 6 wherein said resilient elements are disposed on said body member and said finger operable member is slidable towards said body member and arranged to move the resilient elements so that the finger operable member moves within the ring during the snap action.

9. A mechanism as claimed in any preceding claim wherein said body member comprises a screw cap for connection with a fluid container.

10. Operating mechanisms substantially

as described with reference to the accompanying drawings.

11. A container of fluid medicament  
having a pump mechanism operable by an  
5 operating mechanism, the operating mechanism being as claimed in any preceding claim.

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